Choanal atresia may be bony (90%) or membranous (10%) and is generally sited just in front of the posterior end of nasal septum. The congenital choanal atresia should not be considered as an isolated plate of bone but as one component of a skull base anomaly developing between the 4th and 12th weeks of gestation. The current investigation of choice is CT and gives information whether the obstruction is membranous or bony and the actual structures involved and its thickness.

Computerized tomography has demonstrated thickening of the vomer, bowing of lateral wall of the nasal cavity and fusion of bony elements in choanal region. Multi-system abnormalities have been found in association, may be as random affiliations or to a limited number of specific defects – the so called CHARGE association. In the present series, no other abnormality was found except the thickening of vomer [Figure 1].

Congenital unilateral choanal atresia has been found to be associated with DNS and may be masked with nasal polyps.

Transnasal endoscopic repair of choanal atresia is a safe and successful technique and nasal endoscopes have provided a modality for transnasal treatment of choanal atresia without prolonged stenting.

In our series, under direct visualisation with endoscope, the atretic plate was removed. No stent or balloon was required subsequently and results at 1 year follow up were very good. Thus, nasal endoscopy provides an excellent method in cases with thin bony and membranous atresias.

**CONCLUSIONS**

Unilateral choanal atresia usually presents in younger age groups but can present very late in adults with symptoms like rhinorrhoea and nasal obstruction. A possibility of this diagnosis should be kept in mind and CT scan is the investigation of choice which also aids in deciding the type of approach to be followed as nasal endoscope provides an excellent method for thin bony and membranous atresias.

**REFERENCES**


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Impacted injuries of the maxillofacial area pose a challenge for the managing team as it happens to be of a serious nature and uncommon in practice with resultant limited experience. We report on a victim of stab wound, with the knife in situ traversing three distinct anatomical sites in the maxillofacial region.

**CASE REPORT**

54-year-old male J.S.M was admitted in the hospital with a knife embedded in the left eye pointing posteriorly and downwards. The inferior eyelid encased one side of the blade, while the other side was completely covering the eyeball and superior lid [Figure 1]. Hence the vision could not be assessed. Tip of the knife was seen on the soft palate with a laceration in the left tonsil. There were four superficial lacerations in the neck and two on the face below the left lower eyelid. The plain X-rays of the skull showed the knife to be transgressing the floor of the orbit, maxillary antrum, and emerging through the soft palate to project inside the oropharynx [Figure 2A, B] on the left side. The CT scan helped ruling out structural deformity of the eyeball and haematoma. It also enabled three-dimensional reconstruction of the skull with knife in situ [Figure 3]. He had no other injuries, was conscious and fit for emergency anaesthesia. The knife did not hinder anaesthetic intubation. Through sub labial maxillary sinus antrotomy, the knife with its transgression along the roof, lateral wall and posteromedial aspect, of the antrum, was inspected with naked eye [Figure 4] and a 30° endoscope. The sinus mucosa on the lateral wall was separated and the edge of the knife could be seen without active bleeding. No bony fragments were found in the antrum. An attempt for removal of the knife manually after stabilisation of the head and neck, proved to be difficult. Further pulling was stopped to avoid injury to cervical spine. Through a subclinical incision the orbicularis oculi was separated and the orbital periosteum was elevated up to entry wound of the knife. Release of the tissue did not ease the knife either. A lateral osteotomy around the path of the knife was done on the left zygoma. Then the knife was pushed from its tip by artery forceps while simultaneously being pulled by the handle from above. With this manoeuvre, the knife got released and was removed. The minimal bleed in the lateral wall of maxilla was arrested by pressure with Gel foam. The eyeball appeared intact except for conjunctival injury in the inferior fornix [Figure 5], and the Ophthalmologist sutured that. All other wounds were closed. Although there was no gross herniation in the roof of the antrum, the clinical picture was simulating an orbital blowout fracture. Hence, a Foley’s catheter with inflated bulb was positioned in the antrum through inferior meatal antrostomy and kept for 48 h. The patient received antibiotics and tetanus prophylaxis. He had unaltered visual acuity with normal fundus, but occasional diplopia on the extreme right supero-lateral gaze, and numbness over the left mid face, in the immediate postoperative period. Except for anticipated signs like mild soft tissue swelling along the path of the knife, and minimal air pockets, the postoperative CT scan did not show any abnormality. Through the window of sinusotomy, in the three-dimensional reconstruction, the roof of the antrum appeared to have almost healed [Figure 6]. Oral feeding was resumed after 3 days and skin sutures removed after 7 days. The paroxysmal diplopia disappeared in 4 weeks but the facial numbness persisted. Except for this minor morbidity, the patient was extremely satisfied with the outcome.

**DISCUSSION**

Maxillofacial injuries with impacted knife in situ are very rare. Considerable dispute lies in naming this condition itself. Considering the rarity, any experience reported in the literature appears significant. Cohen and Boyes-Varley[10] reported 37 cases of penetrating injuries with retained foreign bodies in the maxillofacial region. Of this only four were the result of knife injuries. Stab wound entering the orbit is an unusual subset of maxillofacial injury.[21] Our case with a knife impacted about 9 cm, transgressing three distinct anatomical sites, is of a rare entity.

Radiographs at right angle to each other appear to be appropriate to delineate the path and extent of the injury.[11] [Figures 2 and 3] of our case illustrate this aspect. The CT scan was used as an adjunct. Although it carried scatter, it helped in assessing the structure of the eyeball. We did not resort to arteriography as there were no signs to suspect significant vascular injury. The cutting edge of the blade was within the bony structure of zygoma and maxilla, and the tip of the knife was seen on the soft palate. If bleeding had to occur then the expected origin was from maxillary and greater palatine arteries and these vessels are accessible through the antral window and oral cavity, and if necessary, by external carotid ligation in the neck. In fact angiography is reported to
Impacted knife injury of the orbit, maxilla and oropharynx

Figure 2: A–B. X-Ray skull A-P and Lateral view showing cranio-caudally and antero-posteriorly, the extent of injury

Figure 3: Three-dimensional image CT Scan showing the knife in situ

Figure 4: Knife seen through the sublabial antrotomy

Figure 5: Intact eye ball with conjunctival injury

Figure 6: Postoperative three-dimensional image CT Scan. Antral roof visible through the sinusotomy window appears to have almost healed

be reserved for deep injuries with high index of suspicion for vascular laceration.\[^3\]

Although simple withdrawal of retained knife blades from facial wounds is reported in the literature,\[^4\] managing this type of injury in the operating theatre proved to be ideal.\[^5\] Tamponade of the lacerated vessel by the impacted knife itself is reported in the literature\[^6\] and removal of this might result in significant haemorrhage that is uncontrollable bedside. Antrotomy enabled a clear view of the injury in the maxilla. Pulling the knife by the handle resulted only in moving the head and not the knife. Because of this snugly fit nature of the impaction, nibbling of bone along the path, by osteotomy, was resorted to. Hence it appears that, mere pulling, outside the operation theatre settings, cannot be a treatment option for such a situation. Haemostasis was achieved with ease, as there was no major vessel injury, as expected. However the escape of the eyeball from the injury was to our pleasant surprise.
The morbidities to mention are numbness over the face in the maxillary area and the paroxysmal diplopia on extreme right upper lateral gaze. The numbness could be explained by the injury to the left infra orbital nerve. The minimal double vision was attributed to subsiding reactive oedema in the floor of the orbit. Although intra oral communication would have added contamination, antibiotics helped in avoiding complication through infection.

The deep impaction itself could have been a saving factor for the patient. If the assailant could have easily withdrawn the knife, the patient might have received another stab that may not have carried the same luck as to miss vital structures.

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